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FOREST INSECT SURVEY

BLACK'S MOUNTAIN EXPERIMENTAL FOREST

SEASON 1943

BY
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INTRODUCTION

Annually since 1937 the Black's Mountain Experimental forest, comprising 16 sections of timbered land in the Eastern Lassen Area, Lassen National Forest, California, has been cruised 100 percent for insect-caused loss. The first insect loss survey of the area in 1937 was conducted by personnel of the California Forest and Range Experiment Station in order to obtain an accounting of the timber drain due to insect attack since the Black's Mountain Forest was established as an experimental area in 1934. Because of the entomological research value of such a loss survey in connection with the cooperative pine management studies which were being undertaken at Black's Mountain, the Bureau of Entomology and Plant Quarantine agreed to assume responsibility for conducting and maintaining the annual loss cruise. Our inability to obtain temporary assistants for the completion of the survey in 1942 and 1943 made it necessary to borrow help from the Experiment Station in order to complete the survey during those two years and thereby provide for an uninterrupted record of seasonal loss in the fulfillment of the entomological objectives on the experimental area.

In 1943, due largely to reduced manpower available for the survey and the pressing need for attention to other priority assignments, it was necessary to limit the seventh annual survey at Black's Mountain to a total of 74 percent cruise of the 10,000 acres. The cruise included all of the cut areas and approximately 50 percent of the remaining virgin lands. Since insect-caused loss on the experimental area was known to be at the lowest point in the past record, it was felt that the partial cruise in 1943 would be sufficient to satisfy the objectives of the Bureau of Entomology and Plant Quarantine on its phases of the cooperative study at Black's Mountain.

OBJECTIVES OF THE SEASONAL LOSS SURVEY

The 100 percent insect-loss survey on the Black's Mountain Experimental forest has had as its principal objectives: (1) an accurate accounting of current insect loss conditions, compartment by compartment; (2) the detection of possible outbreaks or centers of high infestations and loss; (3) to provide a sound basis for selecting areas within the experimental forest for recommendations as regards insect control through sanitation-salvage operations; (4) to provide bases of comparison in testing the control effectiveness of sanitation-salvage cuttings; and (5) to furnish the Experiment Station with an annual record of loss in order that they could maintain accurate up-to-date inventories of stand conditions on

all compartment areas. The purpose of this report is to present (1) the record of loss for 1942; (2) the trend of infestations in 1943; and (3) to give an outlook of conditions expected in 1944. Loss records in this report are only for virgin areas; those on cutover areas will be given later in reporting on other studies comparing infestations on cutover and virgin lands.

RECORD OF LOSS ON VIRGIN AREAS FOR 1942

Characteristics of the Seasonal Infestation.

A complete 1942 record of loss on the uncut area at Black's Mountain will not be obtained until the remaining virgin area not cruised in 1943 is covered in the survey during 1944. However, the total 1942 loss was obtained on enough of the virgin areas in each forest block to provide a satisfactory base for annual loss figures. It is planned that all of the compartments not cruised in 1943 will be covered during the survey in 1944 and thereby provide for the maintenance of a complete coverage of the experimental area every two years. The area cruised, and for which total loss is recorded for 1942, is shown on the appended map of the Experimental Forest.

Since the 1942 survey of the Black's Mountain Forest was made during October and early November of that year, most of the total seasonal loss should have been recorded at that time. From these records on virgin areas it was estimated that the total kill in pine for the year probably would not exceed 23 board feet per acre, or about half of the loss recorded for the preceding season of 1941. Since the record of loss for 1942 could not be completed during the past year, it has been necessary to use only that portion of the virgin areas where the seasonal record is complete to compare the seasonal loss conditions. The total 1942 record of loss has been obtained on approximately 50 percent of the virgin area. From this portion of the experimental area, 1942 losses average 41 board feet per acre. This loss is only 4 board feet per acre less than the record obtained on the same compartments during 1941.

The Black's Mountain Experimental Forest is divided into five separate forest blocks, each representing a rather homogeneous condition of exposure, timber type and ground cover. These blocks are named according to the more prominent topographical features of the area for convenience in referring to portions of the forest under management. Everyone actively engaged in work on the experimental area is thoroughly familiar with the general conditions of stands on each block. Since this report is intended primarily for the parties working at Black's Mountain, it seems advisable to present the salient features of the seasonal record of loss for each of the five forest blocks separately. The conditions of loss are reported only on virgin areas and comparisons are made only where total records are available for both 1941 and 1942.

BLOCK A. ASPEN FLAT. (Southerly exposure. PP-JP-Sage Type)

On the 240 acres in this block where the complete record of loss has been obtained for 1942, it was found that ponderosa and Jeffrey pine losses were 20 percent below the record of 1941, averaging 37 board feet per acre. The decreased infestations occurred evenly in both ponderosa and Jeffrey pine. All loss in both tree species occurred only as singly infested trees and these were widely scattered over the area. Pine losses on this block differed but slightly from the average of the forest as a whole. These conditions, as determined from the cruise of but 30 percent of the virgin area in this block, are believed to be generally similar to the remainder of the timber surrounding Aspen Flat.

BLOCK B. BLACK'S MOUNTAIN. (South slope. PP-JP-WF-Type)

In contrast to the records in all previous years, the total 1942 record of loss on 747 acres of virgin timber on Block B showed a decline. The current kill in pine on this area, amounting to 35 board feet per acre, is 52 percent below the record obtained on the same compartments in 1941, and is 18 percent below the 1942 average which has been determined for the forest as a whole. The decrease in current loss is even and proportional for both ponderosa and Jeffrey pine. All loss was scattered and occurred only as singly infested trees.

BLOCK C. COBB MOUNTAIN. (Northwest slope. PP-WF Type)

A complete record of loss for 1942 has been obtained on 599 acres in this block of relatively high quality pine timber and was found to average 22 board feet per acre, 53 percent below the average estimated for the forest as a whole, and 27 percent below the record obtained in 1941 on the same compartment areas. All loss was scattered and occurred only as singly killed trees.

BLOCK G. GRASS VALLEY. (Southwest exposure. PP-JP Type)

The 1942 loss on 876 acres in this block showed a slight increase over the conditions encountered on the same areas in 1941. Scattered losses, predominately in ponderosa pine, occurred as singly infested trees, averaging 42 board feet per acre, par with the 1942 average loss for the forest as a whole.

BLOCK F. PATTERSON MOUNTAIN. (Southwest slope. PP-JP-WF Type)

A complete record of loss was obtained only on 191 acres in this block for 1942 and the record may not represent a true picture of infestations for the block as a whole. On the area cruised, the average pine loss amounted to 92 board feet per acre, which is over twice the average loss in 1941 on those same compartment areas. Since the average in 1941 on all virgin areas in this block was the same as that obtained only on the 191 acres, it is felt that the current record does indicate an upward trend and increased loss on Patterson Mountain for 1942. The increased current kill occurred predominately in ponderosa pine but all loss was scattered and no evidence was noticed of aggressive or localized centers of infestations.

INSECT-CAUSED LOSS BY TREE SPECIES

Although four species of trees occur in commercial quantities on the experimental forest; namely (1) ponderosa pine, (2) Jeffrey pine, (3) white fir, and (4) incense cedar; the latter two species make up less than 10 percent of the total stand volume and therefore are of minor importance in obtained yield plans for the management of this forest. However, in localized areas, white fir and dense thickets of its reproduction often are found in keen competition with, or dominant over, the more valuable pines and therefore must be considered in the program of cuttings.

It is of interest to follow the seasonal infestation in white fir, primarily composed of the fir engraver beetle, Scolytus ventralis Lec., inasmuch as there has been a considerable decrease in the yearly kill since 1933 and 1934. During the period from 1933-1936, white fir loss amounted to 148 board feet per acre per year. Since 1937, the annual loss in this tree species has averaged only 11 board feet per acre. The per acre loss on the area where complete records have been obtained for 1942 amounted to only two board feet. There is no apparent reason for the sudden and prolonged decrease in this record of loss. However, it is likely that an up-swing in this infestation may again occur as combined conditions favor a build up of fir engraver beetle populations. A tabulation of insect-caused loss in all tree species on the compartment areas where the total record was obtained for 1942 is given in Table 1.

RECORD OF LOSS FOR 1943

From each seasonal insect loss survey on the experimental forest, a general accounting of infestations and loss can be made for the current season. However, it is not until the following year that loss records can be completed for the proceeding season because some trees become infested after the loss cruise has been made, while other trees fail to show a fade in the foliage and thereby escape the notice of the spotters. There is always difficulty, therefore, in accurately estimating the total current kill from the incomplete records of the partial cruise. Since the loss surveys each year are made during the late fall months, most of the trees (estimated at 70 percent in 1943) infested during the season should be recorded. These records from the current cruise indicate that the infestation in 1943 has been further reduced from the low level of 1942.

TREND OF LOSS

A comparison of losses in pine on all forest blocks for the past three years is given in Table 2 (see page 6). The trend of loss for ponderosa and Jeffrey pine separately is given in Table 3.

Table 1: 1942 Insect Loss. Black's Mountain Experimental Forest. Virgin Areas. (Loss's only for areas with complete record for 1942.)

Block	Virgin Timb'd Area	Tree Species	No. of Trees	Volume b.m.	Volume per acre
A	300.6	Ponderosa pine	1	981	4
		Jeffrey pine	3	7,996	33
		White fir	-	-	-
		Incense cedar	-	-	-
B	941.5	Ponderosa pine	17	21,253	29
		Jeffrey pine	4	4,454	6
		White fir	-	-	-
		Incense cedar	-	-	-
C	1,579.8	Ponderosa pine	17	17,056	29
		Jeffrey pine	-	-	-
		White fir	5	5,598	9
		Incense cedar	-	-	-
G	1,126.8	Ponderosa pine	22	35,638	41
		Jeffrey pine	1	148	1
		White fir	-	-	-
		Incense cedar	-	-	-
F	1,102.4	Ponderosa pine	13	14,517	76
		Jeffrey pine	2	2,983	16
		White fir	-	-	-
		Incense cedar	-	-	-
All	5,551.1	Ponderosa pine	70	87,445	34
		Jeffrey pine	10	15,581	6
		White fir	5	5,598	2
		Incense cedar	-	-	-

Table 2: Insect Loss. Black's Mountain Experimental Forest. (Pine Species only)
(Records only for virgin acreage cruised)

Block	1941 LOSS					1942 LOSS					1943 LOSS (estimated)				
	Virgin Acres Cruised	No. of Trees	Volume b.m.	Volume per ac.	Ratio 41/40	Virgin Acres Cruised	No. of Trees	Volume b.m.	Volume per ac.	Ratio 42/41	Virgin Acres Cruised	No. of Trees	Volume b.m.	Volume per ac.	Ratio 43/42
A	800.6	22	42,255	53	.70	240.2	4	8,977	37	.70	240.2	-	-	-	.00
B	941.5	49	56,640	60	.33	746.6	21	25,707	34	.57	746.6	12	21,008	28	.82
C	1,826.0	55	65,733	36	.36	598.7	17	16,656	28	.78	598.7	7	7,947	13	.48
D	1,126.8	22	36,861	33	.27	875.9	23	35,786	41	1.24	578.6	3	8,495	14	.24
F	1,102.4	40	52,156	47	.42	191.2	15	17,500	92	1.96	191.2	8	7,556	37	.43
All	5,797.3	188	251,645	43	.38	2,652.6	82	107,694	41	.95	2,355.3	29	49,006	20	.42

Table 3: Trend of Loss in Ponderosa and Jeffrey Pine.
Black's Mountain Experimental Forest.

	INSECT - CAUSED LOSS								
	1941			1942			1943 (estimated)		
Tree Species	Volume b.m.	Volume per ac.	Ratio 41/40	Volume b.m.	Volume per ac.	Ratio 42/41	Volume b.m.	Volume per ac.	Ratio 43/42
P. pine	94,538	36	.30	87,582	33	.93	41,173	18	.47
J. pine	22,727	9	.37	20,652	6	.91	3,833	2	.19

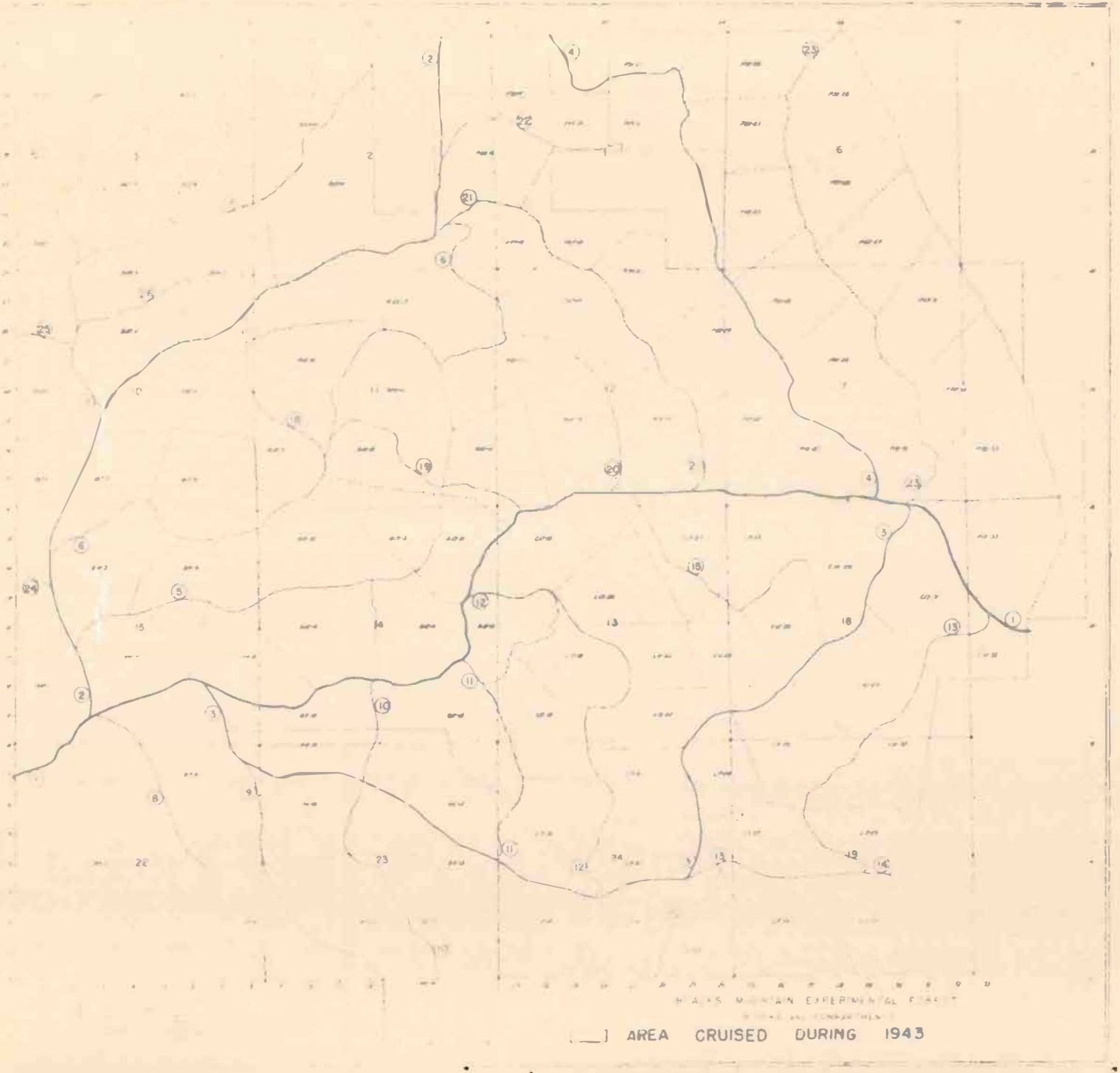
It will be noted from Tables 2 and 3 that the largest decrease from the peak of the infestation in 1940 occurred during 1941. Losses in 1942 were practically the same as those for the preceding season, but another decrease in the infestation trend is predicted for 1943.

In following these infestation trends, it is particularly interesting to note that decreased loss was even and proportional for both ponderosa and Jeffrey pine. By reviewing the record of loss from 1937-1940 it is found that the upward trend in loss during that period was also proportional for both pine species. Since the western pine beetle and the Jeffrey pine beetle are specific in their attack on these two species of pine, and because they differ considerably from each other in their habits, it could be expected that opposite trends in infestations might occur. It seems quite likely that climatic factors favoring or disfavoring the vigor of the host have been largely responsible for the increase and decrease in infestations and have influenced the trend of loss proportionally in both species of pine.

OUTLOOK FOR LOSS CONDITIONS IN 1944

The only means of predicting the amount of loss which might occur during 1944 is by speculating on certain of the factors influencing insect populations and loss trends. Past records indicate that infestations fluctuate from season to season but generally follow a pattern in trends of increasing or decreasing loss. The first annual record of loss at Black's Mountain in 1937 found the infestation at a relatively low level. A gradual increase in the record of loss continued from that year to a peak in 1940. Since 1940, loss trends have been downward with a record low level expected for 1943. On the basis of long-term records from other areas, it can be expected that an increase in loss will follow the present low level. However, it is not probable that a sudden or appreciable up-swing in conditions of loss would occur in a single season. Even if the momentum of populations should start upward during 1944, there would be little chance for more than a normal loss to occur during the season.

Because of the large amount of highly susceptible material available for attack in fire-swept areas, it is generally found that subsequent insect infestations rapidly increase along the periphery of a burned area. During 1943, a conflagration of approximately [illegible] acres swept close to the boundary of the experimental forest. As a result, it is possible that increased infestations and loss might occur in the south tier of compartments in Block C during the next two or three years.


AREA CRUISED DURING 1943